DESCRIPTION

Transmitting Apparatus and Receiving
Apparatus

Technical Field

5   The present invention relates to a
transmitting apparatus and a receiving apparatus that
are used in the field of a technology for delivering
video/audio data to an infinite number of subscribers
and that allow desired data to be effectively selected
10   from a large amount of successive data so as to
receive, store, and browse the selected data.

Related Art

         Many techniques have been proposed as data
delivering systems. For example, on the Internet, data
15   is delivered using WWW (World Wide Web) corresponding
to HTTP (Hyper Text Transfer Protocol). To retrieve
desired data from a huge amount of data collection of
WWW (World Wide Web), the use of meta data is becoming
common. The meta data contains a data structure. As
20   an example of systems that selectively receive data
corresponding to meta data from WWW, PICS (Platform for
Internet Content Selection) and RDF (Resource
Description Framework) have been proposed.

         In a digital broadcast, meta data such as a
25   program title and broadcast time data that are
structural elements of EPG (Electronic Program Guide)
is transmitted in the format of EIT (Event Information

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Table). Information of EPG is represented as a section
type table or the like referred to as SI (Service
Information). A receiver extracts relevant information
from the table and displays the extracted information
on its screen. With EPG, the user can select data as
programs from successive broadcast data.

Although a digital broadcast is mono-
directionally transmitted to a very large number of
terminal units, a large amount of data can be
simultaneously transmitted. Thus, it is advantageous
to merge a digital broadcast and a network. In
reality, meta data is added to contents data on the
Internet or contents data of a digital broadcast.

The format of meta data of a digital
broadcast (for example, EIT) is not compatible with the
format of meta data of a conventional network such as
the Internet. To solve this problem, both types of
meta data are used as they are. However, in a system
using WWW such as PICS or RDF, since meta data is
represented in a text format, the transmission
efficiency is not high. In addition, to selectively
receive meta data through a broad band broadcast
network, the receiver side should filter received data
at high speed. However, in the text format, it is
difficult to filter received data at high speed.

On the other hand, meta data such as EIT of a
digital broadcast has a dedicated format. The meta

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data is transmitted using predetermined descriptors. In other words, a converting method for converting meta data such as EIT into data corresponding to WWW has not been defined. In addition, a method for transmitting flexible meta data such as PICS or RDF corresponding to the MPEG system used in a digital broadcast and a format that represents meta data have not been defined.

To solve these problems, a method for converting such meta data in a format suitable for a digital broadcast has been proposed in a prior patent application (Japanese Patent Application No. Hei 10-170397). In other words, in the prior patent application, as with EPG, meta data corresponding to a RDF model is represented as a section type table referred to as SI.

When contents data on a network such as the Internet is communicated as a digital broadcast, contents data on the network is shorter than contents data of the digital broadcast. Thus, it is preferred to use meta data that is shorter than that of each program. Meta data of EIT of a digital broadcast is used to select successive data of each program. In other words, it is difficult to represent meta data for partial data and the relation of meta data of partial data. Thus, it cannot be said that meta data for a digital broadcast is suitable for representing contents data on the network.

The user can temporarily store contents data of a digital broadcast. When necessary, the user can retrieve contents data from a storage medium and reproduce the retrieved contents data. In this case, using meta data of each program, the user cannot arrange the structure of programs corresponding to his or her favorite. In addition, when a storage medium is changed, segmentation information cannot be used.

Disclosure of the Invention

Therefore, an object of the present invention is to provide a transmitting apparatus and a receiving apparatus that allow data to be effectively delivered and flexibly and selectively received corresponding to a user's favorite in such a manner that contents data is segmented and meta data is correlated with any partial data.

To accomplish the above-described object, the present invention is a transmitting apparatus for providing contents data composed of successive data, comprising a meta data schema storing means for storing the data structure of meta data of the contents data, a contents segmenting means for generating segmentation information of the contents data, a meta data combining means for correlating the segmentation information of the contents data with the meta data, a meta data converting means for converting the meta data with the segmentation data combined by said meta data combining

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means in a transmission format, a meta data schema
converting means for converting the meta data schema
stored in said meta data schema storing means in the
transmission format, and a transmitting means for
transmitting the meta data with the segmentation
information in the transmission format, the meta data
schema in the transmission format, and the contents
data through a transmission path.

In addition, the present invention is a
transmitting apparatus for providing contents data
composed of successive data, comprising a meta data
schema storing means for storing the data structure of
meta data of the contents data, a contents segmenting
means for generating segmentation information of the
contents data, a segmentation information storing means
for storing the segmentation information of the
contents data, a meta data combining means for
correlating an identifier of the segmentation
information with the meta data, a meta data converting
means for converting the meta data with the identifier
combined by said meta data combining means in a
transmission format, a meta data schema converting
means for converting the meta data schema stored in
said meta data schema storing means in the transmission
format, a segmentation information converting means for
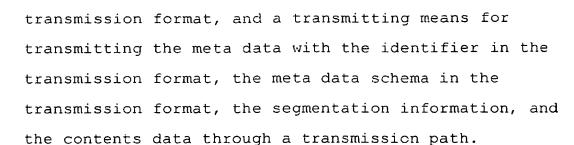converting the segmentation information stored in said
segmentation information storing means in the

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transmission format, and a transmitting means for
transmitting the meta data with the identifier in the
transmission format, the meta data schema in the
transmission format, the segmentation information, and
5   the contents data through a transmission path.

In addition, the present invention is a
receiving apparatus for presenting contents data
composed of successive data, comprising a meta data
schema storing means for storing the data structure of
10   meta data of the contents data, a meta data storing
means for storing meta data with segmentation
information of the contents data, a user profile
operating means for operating user's favorite
information, a meta data analyzing means for collating
15   the meta data schema, the meta data, and the user
profile, a contents reproduction controlling means for
controlling the reproduction of the contents data
corresponding to segmentation information that is
output from said meta data analyzing means, a receiving
20   means for receiving meta data with segmentation
information in a transmission format, a meta data
schema in the transmission format, and contents data
through a transmission path, a meta data schema
restoring means for restoring the meta data schema in
25   the transmission format into meta data schema in a
storage format of said meta data schema storing means,
and a meta data restoring means for restoring the meta

data with the segmentation information in the transmission format into meta data with segmentation information in a storage format of said meta data storing means.

In addition, the present invention is a receiving apparatus for presenting contents data composed of successive data, comprising a meta data schema storing means for storing the data structure of meta data of the contents data, a meta data storing means for storing meta data with an identifier of segmentation information of the contents data, a segmentation information storing means for storing the segmentation information, a user profile operating means for operating user's favorite information, a meta data analyzing means for collating the meta data schema, the meta data, and the user profile, a contents reproduction controlling means for controlling the reproduction of the contents data corresponding to segmentation information that is output from said meta data analyzing means, a receiving means for receiving meta data with the identifier in a transmission format, a meta data schema in the transmission format, segmentation information in the transmission format, and contents data through a transmission path, a meta data schema restoring means for restoring the meta data schema in the transmission format into meta data schema in a storage format of said meta data schema storing

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means, a meta data restoring means for restoring the meta data with the identifier in the transmission format into meta data with an identifier in a storage format of said meta data storing means, and a

5   segmentation information restoring means for restoring the segmentation information in the transmission format into segmentation information in a storage format of said segmentation information storing means.

As described above, according to the present
10   invention, since segmentation information of contents data is correlated with meta data and the resultant data is delivered, any segments of successive data can be restructured as contents data corresponding to a user's favorite. Thus, data can be effectively
15   delivered and flexibly and selectively received. In addition, segmentation information and meta data are represented using RDF and XML (Extensible Markup Language) in WWW. The resultant data is converted in a suitable transmission format such as the MPEG-2 format
20   or IP format. Thus, meta data can be more flexibly delivered.

Brief Description of Drawings

Fig. 1 is a block diagram showing a communication system according to the present
25   invention; Fig. 2 is a block diagram showing an example of a broadcasting station according to the embodiment of the present invention; Fig. 3 is a block diagram

showing an example of a receiving terminal unit according to the embodiment of the present invention; Fig. 4 is a schematic diagram for explaining a segmentation according to the embodiment of the present invention; Fig. 5 is a schematic diagram for explaining segmentation data according to the embodiment of the present invention; Fig. 6 is a schematic diagram for explaining a meta data schema according to the embodiment of the present invention; Fig. 7 is a schematic diagram for explaining meta data with segmentation data according to the embodiment of the present invention; Fig. 8 is a block diagram showing an example of a broadcasting station according to another embodiment of the present invention; Fig. 9 is a block diagram showing an example of a receiving terminal unit according to the other embodiment of the present invention; Fig. 10 is a schematic diagram for explaining a meta data schema according to the other embodiment of the present invention; Fig. 11 is a schematic diagram for explaining segmentation data according to the other embodiment of the present invention; Fig. 12 is a schematic diagram for explaining meta data according to the other embodiment of the present invention; Fig. 13 is a block diagram for explaining a medium converting process according to the other embodiment of the present invention; Fig. 14 is a schematic diagram showing an example of

segmentation data according to the other embodiment of the present invention; Fig. 15 is a schematic diagram showing another example of segmentation data according to the other embodiment of the present invention; and

5   Fig. 16 is a schematic diagram showing a further example of segmentation data according to the other embodiment of the present invention.

Best Modes for Carrying out the Invention

Next, an embodiment of the present invention

10   will be described. Fig. 1 shows an example of the structure of a contents delivering system according to the present invention. Information providers 101a and 101b each have a database. The database stores contents data, a meta information schema that

15   represents the structures of meta information of the contents data, and meta information corresponding to the contents data. The contents data is for example WWW pages. The information providers 101a and 101b are connected to a broadcasting station 102 and receiving

20   terminal units 103a and 103b through a bidirectional network 105. The information provider 101 can supply contents data, a meta data schema, and meta data to the receiving terminal units 103a and 103b through the bidirectional network 105.

25   The broadcasting station 102 has a database that stores contents data, a meta information schema that represents the structure of meta information of

the contents data, and meta information corresponding
to the contents data. The contents data is for example
broadcast programs. The broadcasting station 102 is
connected to the receiving terminal units 103a and 103b

5   through a broadcasting network 104. The broadcasting
station 102 can supply contents data, a meta
information schema, and meta information to the
receiving terminal units 103a and 103b. In addition,
the broadcasting station 102 can receive contents data,

10   a meta information schema, and meta information from
the information provider 101 through the bidirectional
network and deliver them to the receiving terminal unit
103 through the broadcasting network 104.

　　　　　 Fig. 2 shows an example of the structure of
the broadcasting station 102. A contents storing

15   portion 203 stores contents data supplied to the
receiving terminal units 103a and 103b. Contents data
provided by the information providers 101a and 101b may
be temporarily stored to the contents storing portion

20   203. As with a live program, when contents data is
broadcast while it is being produced, the contents
storing portion 203 may be a cache for temporarily
storing contents data that is monitored.

　　　　　 A meta data schema storing portion 201 stores

25   a meta data schema that represents the structure of
meta data for contents data stored in the contents
storing portion 203. A meta data schema defines the

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structure of information that is added to program data.

The information added to the program data is for

example "program title", "program genre", "broadcast

time", and "parental guide". The number of meta data

5   schemas stored in the meta data schema storing portion

201 is not limited to one. A meta data schemas is

identified by a meta data schema identifier.

When contents data is a television program,

"program name", "program genre", and "parental guide"

10   are added thereto as meta data. When contents data is

a data broadcast, "program name", "program genre", and

"applicable OS" are added thereto as meta data. Since

the structure of meta data added to contents data

varies for each contents data or year by year, there

15   may be a plurality of meta data schemas. Before meta

data is transmitted, a meta data schema that represents

the structure thereof is transmitted to a receiving

apparatus through the bidirectional network or the

broadcasting network so that the meta data schema can

20   be updated.

A contents segmenting portion 204 generates

segmentation data for selecting a particular segment

from successive data supplied from the contents storing

portion 203 and supplies the segmentation data to a

25   meta data combining portion 202. The meta data

combining portion 202 correlates meta data of a

particular segment of successive data with the

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segmentation data corresponding to the structure of the meta data schema, combines the meta data and the segmentation data, and outputs meta data with segmentation data.

For example, as meta data of a particular program or meta data of a segment of a program, segmentation data that identifies the program or the segment is output. In the case that a program is a segment, segmentation data is added to meta data of "program title: seven o'clock news" and "genre: news" and output as meta data with segmentation data. In the case of a segment of a program, segmentation data is added to meta data of "genre of news: politics" and output as meta data with segmentation data. The output data of the meta data combining portion 202 also contains an identifier of the meta data schema of the meta data. In reality, as segmentation data, "start time" and "end time" of the segment or "start time" and "duration" of the segment can be represented in combination.

A meta data schema converting portion 205 converts a meta data schema stored in a meta data schema storing portion 203 in a transmission format. Although the descriptive format of a schema stored in the meta data schema storing portion 203 may vary for each contents data or for each information provider, the meta data schema converting portion 205 converts

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the format of a meta data schema into one transmission format. In this case, various types of transmission formats can be used. For example, a meta data schema can be represented in an MPEG system section format. The other meta data and segmentation data can be represented in the similar format.

A meta data converting portion 206 converts meta data with segmentation data generated by the meta data combining portion 204 in the transmission format. The descriptive format of meta data combined by the meta data combining portion 204 may vary for each contents data or each information provider. However, the meta data converting portion 206 converts the format of meta data into one transmission format. A contents converting portion 207 converts contents data of successive data in the transmission format.

A meta data schema transmission controlling portion 208, a meta data transmission controlling portion 209, and a contents transmission controlling portion 210 control the transmissions of a meta data schema, meta data with segmentation data, and contents data that have been converted in the transmission format against a transmission path. In the case of the broadcasting network 104, it is supposed that the transmission path for a meta data schema, meta data with segmentation data, and contents data is a line corresponding to MPEG-2 system or IP multi-cast. In

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the case of the bidirectional network 105, it is
supposed that the transmission path is a line
corresponding to IP (Internet Protocol) or ATM
(Asynchronous Transfer Mode).

5   In the broadcasting station, a communication
controlling portion is disposed (not shown in Fig. 2).
The communication controlling portion is connected to
the bidirectional network 105. The communication
controlling portion receives requests for a meta data

10   schema, meta data, and contents data from the receiving
terminal units 103a and 103b, retrieves a meta data
schema, meta data, and contents data corresponding to
the requests, and supplies them to the receiving
terminal units 103a and 103b. The structure of each of

15   the information providers 101a and 101b is the same as
the structure of the broadcasting station 102 except
that the former does not have a transmitting portion
that transmits data to the broadcasting network.

        Fig. 3 shows an example of the structure of a

20   receiving terminal unit. A meta data schema reception
controlling portion 301, a meta data reception
controlling portion 302, and a contents reception
controlling portion 303 control the receptions of a
meta data schema, meta data with segmentation data, and

25   contents data that are transmitted through the network.

        The received meta data schema is supplied to
a meta data schema restoring portion 304. The meta

data schema restoring portion 304 restores the received meta data schema in a format so that the terminal unit can easily use the meta data schema. The restored meta data schema is stored to a meta data schema storing portion 305. The received meta data with segmentation data is supplied to a meta data restoring portion 306. The meta data restoring portion 306 restores the received meta data with segmentation data in a format so that the terminal unit can easily use the meta data with segmentation data. The restored meta data with segmentation data is stored to a meta data storing portion 307.

The received contents data is supplied to a contents restoring portion 308. The contents restoring portion 308 restores the received contents data in a format so that the terminal unit can easily use the contents data. The restored contents data is stored to a contents storing portion 309.

The user of the receiving terminal unit references the meta information schema stored in the meta information schema storing portion 305 with a user profile operating portion 310, generates user unique profile information, and stores the user unique profile information to a user profile storing portion 311.

A meta data analyzing portion 312 selects only meta data corresponding to the meta data schema stored in the meta data schema storing portion 305 and

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to the user unique profile information stored in the
user profile storing portion 311.

Corresponding to the segmentation information
contained in the selected meta data, a contents
reproduction controlling portion 313 restructures
segments of the successive data. A data displaying
portion 315 displays the resultant contents data. On
the other hand, a meta data display controlling portion
314 controls the meta data displayed on the data
displaying portion 315. When a communication
controlling portion (not shown) is disposed in the
receiving terminal unit, a meta information schema,
meta information, and contents data can be requested
and received through the bidirectional network 105.

Next, the embodiment of the present invention
will be described in more detail. Fig. 4 explains meta
data and segmentation data. In Fig. 4, successive data
of a program with a channel identifier of Service ID =
Svc #1 is shown. In the case of a digital broadcast, a
program identifier, for example Event ID = E#5, is
added. Such successive data is segmented into for
example eight segments. The eight segments are
assigned segment identifiers ID = S#1, S#2, ...

As shown in Fig. 5, in successive data, each
segment is identified with parameters such as
segmentation data composed of start time and duration
thereof as well as the above-described segment ID. The

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time data is defined in an MPEG-2 stream.

Fig. 6 shows an example of a meta data schema. When a news program is composed of three segments with segment IDs = S#1, S#2, and S#3, it is assumed that the segments are categorized as general, local, politics, economics, and sports. Fig. 7 shows an example of which segmentation data is added to the politics category and the sports category of a news program.

As was described with reference to Fig. 3, when the terminal unit receives meta data with segmentation data, the terminal unit can control the reproduction of contents data corresponding to the segmentation data. Thus, the terminal unit can restructure any segments of the successive data as contents data corresponding to a user's favorite. Thus, data can be effectively delivered and flexibly and selectively received. In addition, segmentation information and meta data are represented using RDF and XML (Extensible Markup Language) in WWW. The resultant data is converted in a suitable transmission format such as the MPEG-2 format or IP format. Thus, meta data can be more flexibly delivered.

Next, another embodiment of the present invention will be described. In the above-described embodiment, segmentation data is added to meta data. However, in the other embodiment, parameters of

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segmentation data are transmitted separately from meta data. In other words, parameters of segmentation data are represented separately from meta data.

Fig. 8 shows an example of the structure of a broadcasting station according to the other embodiment. In Fig. 8, similar portions to those in the structure of the broadcasting station of the above-described embodiment (shown in Fig. 2) are denoted by similar reference numerals and their description is omitted. In the other embodiment, a segmentation data storing portion 211 is disposed. As with the above-described embodiment, a contents segmenting portion 204 generates segmentation data for selecting a particular segment from successive data that is supplied from a contents storing portion 203. The segmentation data is supplied to a segmentation data storing portion 211.

The segmentation data storing portion 211 stores parameters for identifying a particular segment along with a segment identifier for identifying a particular segment of contents data. The parameters are for example start time and duration or start time and end time of a segment. The segment identifier is supplied to a meta data combining portion 202. The meta data combining portion 202 correlates meta data of a particular segment of successive data corresponding to the segment identifier with segmentation data in the format corresponding to the structure of the meta data

schema, combines them as meta data with a segment identifier, and outputs it.

For example, as meta data of a particular program or meta data of a segment of a program, a segment identifier for identifying the program or the segment is output. In the case that a program is a segment, a segment identifier is added to meta data "program title: seven o'clock news" and "program genre: news" and the resultant data is output. In the case of a segment of a program, a segment identifier is added to meta data for example "news genre: politics" and the resultant data is output. The output data contains an identifier of a meta data schema corresponding to the meta data.

Meta data with a segment identifier that is output from the meta data combining portion 202 is processed in the same manner as the above-described embodiment. Likewise, a meta data schema and contents data are processed in the same manner as the above-described embodiment. Segmentation data that is supplied from the segmentation data storing portion 211 is supplied to a segmentation data transmission controlling portion 213 through a segmentation data converting portion 212. The segmentation data converting portion 212 converts the segmentation data stored in the segmentation data storing portion 211 in a transmission format. Although the descriptive format

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may vary for each contents data or each information provider, the segmentation data converting portion 212 converts the segmentation data in one transmission format.   In this case, various types of transmission formats can be used.   For example, data can be represented in an MPEG system section format.

A meta data schema transmission controlling portion 208, a meta data transmission controlling portion 209, a contents transmission controlling portion 210, and a segmentation data transmission controlling portion 213 control the transmissions of the meta data schema, meta data with the segment identifier, contents data, and segmentation data converted in the transmission format against the transmission path.

Fig. 9 shows an example of the structure of a receiving terminal unit according to the other embodiment of the present invention.   In Fig. 9, similar portions to those in the structure of the receiving terminal unit according to the above-described embodiment of the present invention (shown in Fig. 3) are denoted by similar reference numerals and their description is omitted.   In the receiving terminal unit according to the other embodiment, a segmentation data reception controlling portion 316 is disposed.   The segmentation data reception controlling portion 316 controls the reception of segmentation data

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transmitted through the network.

Received segmentation data is supplied to a
segmentation data restoring portion 317. The
segmentation data restoring portion 317 restores the
received segmentation data in a format so that the
terminal unit can easily use the segmentation data.
The restored segmentation data is stored to a
segmentation data storing portion 318.

Corresponding to the segmentation identifier
of the selected meta data and the segmentation data
stored in the segmentation data storing portion 318, a
contents reproduction controlling portion 313
restructures segments of the successive data. A data
displaying portion 315 displays the resultant contents
data. On the other hand, a meta data display
controlling portion 314 controls the meta data
displayed on the data displaying portion 315. When a
communication controlling portion (not shown) is
disposed, a meta data schema, meta data, segmentation
data, and contents data can be requested and received
through the bidirectional network 105.

Next, the other embodiment of the present
invention will be further described. Fig. 10 shows an
example of a meta data schema. When the genre of
contents data is a news program, it is categorized as
general, local, politics, economics, and sports. In
addition, the news is classified as domestic and

overseas. In this case, segmentation data is shown in Fig. 11. As shown in Fig. 11, segmentation data of each segment is composed of a segment identifier and parameters. Fig. 12 shows an example of meta data corresponding to a meta data schema shown in Fig. 10. In the other embodiment, a segment identifier is added to meta data and the resultant data is transmitted.

According to the other embodiment, since segmentation data is represented independently from meta data and they are separately transmitted, a segment of contents data of different mediums can be identified with the same identifier. Fig. 13 shows the structure of a medium conversion between a transmitting medium 41 and a storing medium 43 that are different mediums. In the transmitting medium 41, a program is normally identified with information of channel and time 42. On the other hand, in the storing medium 43, the position on the medium is normally defined with information of cylinder and sector 44.

To exchange data according to the other embodiment between the medium 41 and the medium 43, converting portions 45, 46, 47, and 48 are disposed therebetween. The converting portion 45 converts a meta data schema in a suitable format corresponding to a medium. The converting portion 46 converts meta data in a suitable format corresponding to a medium. The converting portion 47 converts segmentation data in a

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suitable format corresponding to a medium. The
converting portion 48 converts contents data in a
suitable format corresponding to a medium. In addition
to converting the descriptive format of segmentation
data, the segmentation data converting portion 47
converts parameters of segmentation data corresponding
to the descriptive format of a segment of contents data
identified by the converted descriptive format of the
segmentation data.

In this case, in the segment identifier, only
parameters are converted in a suitable format
corresponding to a medium. Figs. 14, 15, and 16 show
examples of segmentation data. Fig. 14 shows an
example of which the medium 41 is a digital broadcast
of which channel identifier Service ID = Svc #1 and
Event ID = E#5. Fig. 15 shows an expression of
segmentation data in the case that events shown in Fig.
14 are stored to one file of which the medium 42 is a
hard disk and of which drive ID = D and file name =
news mpl. Fig. 16 shows an expression of segmentation
data in the case that the events shown in Fig. 14 are
successively stored to files of which the medium 42 is
a hard disk and of which drive ID = D and file name =
news mpl.

According to the present invention, with
segmentation data, the reproduction of contents data
can be controlled. Thus, any segments of successive

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data can be restructured as contents data corresponding to a user's favorite. Thus, data can be effectively delivered and flexibly and selectively received. In addition, segmentation information and meta data are represented using RDF/XML in WWW. The resultant data is converted in a suitable transmission format such as the MPEG-2 format or IP format. Thus, meta data can be more flexibly delivered. Moreover, according to the present invention, since segmentation data is separately represented and transmitted, segmentation information can be stored and used between different mediums.